VOLUME 1

AN INFORMATION SYSTEM FOR THE COUNCIL OF EDUCATIONAL FACILITY PLANNERS INTERNATIONAL MEMBERSHIP INFORMATION NETWORK

School Buildings Services

Alberta
EDUCATION

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AN INFORMATION SYSTEM FOR THE COUNCIL OF EDUCATIONAL FACILITY PLANNERS INTERNATIONAL MEMBERSHIP INFORMATION NETWORK

BACKGROUND REPORT AND IMPLEMENTATION MODELS

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EXECUTIVE SUMMARY

This report addresses the immediate need of the Council of Educational Facility Planners International for a document to assist in the planning process for establishing an information system for its members and other stakeholders who need information on educational facilities.

The contents of this report focus on the major activities to be accomplished and the issues to be considered in order to plan, develop and establish an information service. This report contains the following sections:

Section 1. Introduction: wherein the scope, purpose and limitations of the report are outlined.

Section 2. CEFP/I's Goals for an Information System: wherein these goals are examined objectively and a set of questions emanating from these goals is asked to indicate the issues which need to be addressed in order to plan an ideal service.

Section 3. Information Needs Assessment: wherein the value of conducting a needs survey of the membership to determine what the nature of a CEFP/I information system should be is discussed.

Section 4. Literature of Educational Facilities: wherein the literature pertaining to the field, where to obtain it, how to obtain it and CEFP/I's role in the context of other information providers is discussed.

Section 5. Functions of an Information Service: wherein the six basic functions of a service, the objectives of the functions and considerations for their implementation are described.

Section 6. Technology Available to CEFP/I: wherein computer communications and applications useful in implementing information service functions are described.

Section 7. Models for the Development of Information Services: wherein possible steps for implementing functions are outlined, and the cooperative roles of CEFP/I information centres are discussed.

Section 8. Recommendations: wherein short-term and long-term activities for the development of a CEFP/I information service are discussed.

Recommendations focus on the need for CEFP/I to consider the issues and considerations raised in this report in order to make informed decisions about the development of an information service.

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Several CEFP/I members and others involved in educational facility planning and design in Alberta gave willingly of their time to be interviewed in person and by telephone. Their discussions on information needs, and their comments and ideas provided valuable background to the preparation and development of this report.

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SUMMARY REPORT

The Council of Educational Facility Planners International, at its 1984 International Conference in Toronto, set its primary goal as the establishment of an information system to collect and disseminate information on educational facilities to members and other stakeholders. The final result envisioned would be a "one-stop shopping centre for educational facility planning whereby members would be referred to the resource desired". The ideal information system proposed by CEFP/I is a major step in formalizing their present activities of exchange and dissemination.

In order to implement the ideal information system, the following questions need to be addressed:

1. What problem does the establishment of an information service address?

2. What kind of information service will best serve the needs of CEFP/I members and other stakeholders?

3. Should the service be established on a national, regional or chapter basis?

4. What information do CEFP/I members expect to obtain from such a service?

5. How do they expect to obtain this information?

6. What is the relationship of the CEFP/I information system to other commercially available information services?

Although the report does not attempt to provide answers to these questions, it does provide CEFP/I with the background information necessary to clarify the objectives of their proposed information system, and give direction to their planning process. Several topics are discussed which have direct implications for the development of an ideal CEFP/I information service: the use of an information needs assessment to determine the nature of the information service to be provided; who is currently providing information on educational facilities; how information services can be developed; how they can cooperate with each other to provide a comprehensive service to the membership; and, what role computer technology can play in providing this service.

INFORMATION NEEDS ASSESSMENT

An information needs assessment is a technique used to determine the information requirements of a given set of people. Determining what information is required or needed is fundamental to the development of an information service that will be useful to a majority of members. The major focus of an information needs assessment should be to answer the following questions:

1. Who uses information;

2. What information is used or needed;

3. How is that information obtained;

4. What information that is not presently used, would be of value.

When these questions have been answered, it should be possible to determine if an information service is needed, with what information it should be concerned, and the most appropriate structure for the service.

Based on research, it is recommended that such an information needs assessment take the form of a questionnaire.

LITERATURE OF EDUCATIONAL FACILITIES

A study of the literature of educational facilities was undertaken to determine what it is, where it can be found, and how to obtain it. Based on the potential information resources available through public and semi-public on-line databases and printed indexes, CEFP/I could define its role as an information provider in several ways: central collector of all material on educational facilities, collector of some part of the available literature; provider of reference service; provider of referral service; or a combination of all.

FUNCTIONS OF AN INFORMATION SERVICE

The information needs assessment provides information about who the users are, what information they would want, and how they obtain their information. The survey of the literature, which determined what resources are presently available to CEFP/I members, provides a context for CEFP/I's role as an information provider. Resolving users' needs with CEFP/I's possible relationship to other information providers, enables planners to clarify the functions which should be implemented in a responsive and efficient information system.

The functions of an information system are:

Identification of materials, the objective of which is to exhaustively search all resources to identify relevant material for a collection;

Collection, the objective of which is to acquire material in order to have ready access to information from a collection;

Access, the objective of which is to provide intellectual access to the collection (e.g. by indexing and abstracting);

Dissemination, the objective of which is the distribution of information from the collection and resource people;

Reference and referral, the objective of which is to provide information from the resources at hand, and/or provide a link to people, organizations, and other sources of information;

Communication, the objective of which is to provide a forum for the exchange of ideas and information.

Not all functions need to be implemented. Only those functions which emanate from the clarified goals and objectives of CEFP/I's information system need to be executed. The functions chosen for execution may also be limited by available budget.

TECHNOLOGY

Several technologies are currently available which could facilitate the implementation of the above functions of an information service. The technologies discussed are: communications via computer; database management systems and considerations for their use; electronic mail and electronic bulletin boards and their applications for facilitating communication and exchange of ideas; and, a communication network (iNet 2000) which facilitates electronic links with other information providers.

MODELS FOR IMPLEMENTATION

The report concludes with a discussion of models for the implementation of an information service. These models outline the functions which are feasible to execute based on available budget and the level of commitment that might be expected from the regions and headquarters. The models represent guidelines and suggestions, not necessarily prescriptions for providing service. Three levels of service which can be provided are outlined. They are:

1. Minimum Service Model includes activities which could be accomplished relatively easily and have immediate benefits to the membership.

2. Standard Service Model includes all the basic functions of an information service. Execution of these functions requires a qualified staff, office space and an appropriate budget.

3. High Tech Model includes all the basic functions of an information service facilitated by the user of computer applications and communications. Implementation of the high tech model requires a substantial budget.

Models are provided which outline levels of cooperation between headquarter-based and region-based information services as possible means of accomplishing the goals of CEFP/I for providing information to their membership. The handling of materials and information in support of the information service can be done by a central authority, the regions, or by a combination of efforts. The models are:

Decentralized Model - Each chapter might develop autonomous information services which would not necessarily strive for the same goals or levels of service due to differing organizational priorities and fiscal constraints. Autonomous regions could perform the identification, collecting and indexing of materials and possibly contribute this information to the headquarters.

Centralized Model - A strong centrally-based information service (i.e. headquarter-based information service) would carry out all functions: identifying, collection, accessing, disseminating and loaning of materials.

Combination Model - A combination of regional information centres with a coordinating central authority at the headquarters is another alternative. The headquarters role in this context can be one of setting basic rules and policy for accomplishing the selection and indexing of materials in the regions. This relationship between the headquarters and the regions can function in a number of ways. The basic difference between the combinations is whether or not there would be duplication of effort between the regions and headquarters.

The determination of levels of service and the development of service in each information centre can take place autonomously, or in conjunction with each other. A bottom-up or top-down approach can be taken to determine the levels of cooperation between headquarters and regions.

In the bottom-up approach, information centres first determine their own levels of service based on local conditions, and then consider cooperation with other information centres. Service models (i.e. minimum, standard, or high tech) are looked at first; models for cooperation are considered after information services are established. This implies that information centres will develop at their own pace to their own level of service, and cooperation with others may subsequently take place.

In the top-down approach, models for cooperative efforts are considered from the outset by information centres. The central authority determines the level of contribution by the regions to provide overall information service to members. Depending on its role, the central authority could dictate the level of service (i.e., minimum, standard, or high tech) provided in other centres, or it might only dictate policy in terms of what is collected and how it is indexed in each information centre.

RECOMMENDATIONS

CEFP/I's present resources (i.e. budget, staff, and time) were not major considerations in the formulation of recommendations. Therefore, recommendations are limited to fundamental activities which the organization should consider undertaking if and when resources are available. The recommendations are:

1. An information needs assessment must be undertaken in order to develop an effective information service.

2. The present membership directory should be upgraded to a directory which is classified by expertise and areas of specialization and/or interests.

3a. Each region should be made responsible for collecting the material generated in its own region and index this material for the benefit of all members, or

3b. One region could be appointed to undertake the collection and indexing of all material generated by CEFP/I members in all regions.

4. Services offered by the information centre in Columbus should be evaluated in terms of the quality of the collection and the present staffing levels. If useful information is available, then services should be marketed.

5. Information provision should be encouraged at the regional level even if a headquarter-based information service is the goal.

6. Providing information costs money; therefore, the more planning that is done, the more cost-effective and efficient the service will be.

SECTION I

INTRODUCTION

The Council of Educational Facility Planners International (CEFP/I) is composed of individuals and firms who are responsible for the planning, designing, creating, maintaining, and equipping of the physical environment of education. Members of CEFP/I number 1043 and are located in North America and overseas. The organization presently sponsors the exchange of information, professional experiences, results of research and other investigative techniques concerning educational facility planning. In 1984, at its international conference in Toronto, Ontario, CEFP/I set its primary goal as the establishment of a major information system to collect and disseminate information on educational facilities to members and other stakeholders.

The ideal information system proposed by CEFP/I is a major step in formalizing their present activities of exchange and dissemination of information. This step will require systematic planning based on informed decisions about what services such an information system should provide.

The purpose of this report is to provide background information on the provision of information services, the issues to be considered, and their implications for planning and design of such services. It is intended to assist CEFP/I planners in clarifying the objectives of their proposed information system, and give direction to their planning process.

CEFP/I's present resources (i.e. budget, staff, and time) were not major considerations in the formulation of suggestions and recommendations presented throughout this report. The only assumption made was that CEFP/I has a serious commitment to formalizing the processes of providing information to its members. Therefore, such suggestions and recommendations are limited to fundamental activities which the organization should consider undertaking if and when resources are available.

SECTION 2

CEFP/I'S GOALS FOR AN INFORMATION SYSTEM

At the 1984 International Conference in Toronto, CEFP/I members met and outlined the future direction of their organization for 1985-1990. The five-year development plan calls for CEFP/I to facilitate the implementation of an information resource bank that would act as clearinghouse and referral service for all members. The final result envisioned would be a "one-stop shopping centre for educational facility planning whereby members would be referred to the resource desired".

The following goal statements for the information resource bank were expressed by Dr. Kulba, President of CEFP/I at a CEFP/I - Alberta Chapter Seminar November 15 - 16, 1986:

1. To discover, collect and disseminate knowledge about educational facility planning.

2. Improve information dissemination systems including written, telephone and computer assisted roles.

3. Develop a computer assisted information retrieval system that will provide members with the most accurate up-to-date information.

4. Develop information systems which would provide members with ready access to the most current procedures for financing capital improvement projects.

5. Establish an information, retrieval and referral system for energy conservation in educational facilities.

6. Establish a clearinghouse of resource people and organizations that have the capability of providing needed information.

7. Play a major role as an information service bureau for persons concerned or involved with educational facilities:
   a. information provider - journals, publications, newsletters, conferences, conventions, training, computer resource bank for selected topics
   b. switcher - personal and computer referral system to other resource centres and clearinghouses.
   c. network operator - personal and automated hub for members to share ideas and exchange information.

Achieving all these goals is a large task and represents an ideal information system for CEFP/I and its membership. In order to implement these goals, the following questions need to be addressed:

1. **What problem does the establishment of an information service address?** Is the problem - lack of communication among members; lack of information about what is available; or, little or no access to information on educational facilities? Once the specific problem(s) is identified, the objectives of the information

system can be outlined and a final plan of action developed. For example, if the problem is lack of information about availability of appropriate literature, CEFP/I might direct their efforts toward a current awareness program; eg., marketing already commercially available information services to members. **Identifying the initial problem enables CEFP/I to focus its planning efforts and resources.**

2. **What kind of information service will best serve the needs of CEFP/I members and other stakeholders?** Is the one-stop shopping centre concept the best solution? Will such a service be too costly to maintain and use on a regular basis? Will all members need the same level of service? Can CEFP/I afford to respond to majority and minority needs? If the information needs of most members are currently being filled through personal contact with colleagues, CEFP/I resources might be best focused on improving the channels of informal communication and exchange of ideas.

3. **Should the service be established on a national, regional or chapter basis?** This question deals with the notion of centralization vs. decentralization. Some functions of an information service are best controlled centrally, while others are best dealt with at a decentralized level. Constraints on resources; i.e., time, money, personnel coupled with immediate needs of members, may indicate the initial establishment of independent services on a regional or even chapter level. Such developments may be encouraged as interim steps. CEFP/I's role could be the facilitation and encouragement of resource sharing among the independent services to an "ideal" system.

4. **What information do CEFP/I members expect to obtain from such a service?** What is feasible to provide given available time, money and personnel? Do members and stakeholders expect a variety of statistical information; i.e., mographic projections, blueprints, government reports, etc.? This has implications for housing and maintenance of material, how and by whom material is collected, scope and content of the collection of materials and the intellectual access to the collection (method of indexing).

5. **How do they expect to obtain the information?** Who will pay for the process of obtaining information? Will CEFP/I fully subsidize such a service or will users pay for a percentage? Do members and stakeholders expect immediate response to their queries? Is a 2-3 week response time for requested material acceptable? Are members willing to invest in technology to improve response time (computer hardware and software)? Phone and written requests for information usually entail a longer response time (depending on nature of query) than if the member could communicate needs and transfer information quickly via computer networking.

6. **What is the relationship of the CEFP/I information services to other commercially available information services?** Does CEFP/I wish to identify, collect and disseminate information already available from other services? Depending on how CEFP/I defines its role in this context, the organization could take advantage of already established clearinghouses (e.g., ERIC) by sending relevant materials to the service to be microfilmed and made accessible to an international audience. Resources could therefore be focused towards other

areas of information provision; e.g., research, current awareness programs, etc., rather than in the costly pursuits of identification, collection, and dissemination.

The following sections of this report attempt to provide the background information necessary to address these questions. Several topics are discussed which have direct implications for the development of an ideal CEFP/I information service: the use of an information needs assessment in determining the nature of the information service to be provided; who is currently providing information on educational facilities; how information services can be developed; how they can cooperate with each other to provide a comprehensive service to the membership; and, what role computer technology can play in providing this service.

TABLE 1

Subject Classification of Public and Semi-Public Information Sources (Online Databases and Printed Indexes) Available to CEFP/I
Descriptions of the Following are available in Appendix C

BUSINESS MANAGEMENT
ABI/Info
Canadian Business and Current Affairs
Management Contents
Economic Literature Index

COMPUTER TECHNOLOGY
Computer Database
INSPEC
Microcomputer Index

CONSTRUCTION, ENGINEERING, INDUSTRY
ACOMPLINE
Applied Science and Technology Index
Compendex
Ei Engineering Meetings
Federal Research in Progress
IBSEDEX
Industry and International Standards
INSPEC
NTIS
OON
Standards and Specifications

CURRENT AWARENESS
EDLINE
Education Daily Online
Ei Engineering Meetings
Meeting Agenda
School Practices Information File

DEMOGRAPHICS AND STATISTICS
American Statistics Index
ASIST
CANSIM
Population Bibliography

EDUCATION
Alberta Education Index
Australian Education Database
British Education Index
Canadian Education Index*
Directory of Education Research and Researchers in Australia
EDLINE
Education Daily Online
Education Index
Educational Research Forum
ERIC
EUDISED
Federal Research in Progress
Francis: Sciences de l'Education
In-House Reports of School Boards*
Ontario Education Resources Information System (Onteris)
School Practices Information File
UNESCO

ENERGY
DOE Energy
Energy
Energy Information Resources Inventory
Energy Programs
Energyline
Energynet

ENVIRONMENT
Environmental Forum
Environmental Bibliography

LEGAL
Environmental Forum
Environmental Bibliography

LEGAL
Statutes of Alberta (other provinces and territories also available)

RESEARCH IN PROGRESS
CANREG
Directory of Education Research and Researchers in Australia
Educational Research Forum
EUDISED
Federal Research in Progress
Microlog
SSIE Current Research

URBAN PLANNING
ACOMPLINE
PLANEX
Index to Current Urban Documents*

GENERAL
Bibliographic Guide to Government Publications: Foreign*
CATSS
CODOC
Dissertation Abstracts Online
Federal Research in Progress
GPO Monthly Catalog
GPO Publications Reference File
Index to Current Urban Documents*
International Bibliography - Publications of Intergovernmental Organizations*
Microlog
Monthly Checklist of State Publications*
PAIS International
Social Scisearch
Sociological Abstracts
SSIE Current Research
UNESCO

*available as a printed index only

SECTION 3

INFORMATION NEEDS ASSESSMENT

A. WHAT IS AN INFORMATION NEEDS ASSESSMENT?

Information needs assessment is a technique used to determine the information requirements of a given set of people. Information is defined as "knowledge that you already have about a subject; advice, facts and opinions received from other people; and data contained in documents." Determining what information is required or needed is fundamental to the development of an information network or service. One of CEFP/I 's goals is to build an information network. If CEFP/I desires a service that is useful to a majority of members, then an information needs assessment should be carried out.

The major focus of an information assessment should be to answer the following questions:

1. Who uses information?

2. What information is used or needed?

3. How is that information obtained?

4. What information that is not being used, would be of value?

When these questions have been answered, it should be possible to determine if an information service is needed, what information it should be concerned with and the most appropriate structure for a service. The results of an information needs assessment could indicate that required or desired information is being located and this would suggest that an information service is not necessary. On the other hand, the results might indicate that information on current research on educational facilities is required but not readily available. This result would suggest that an information service should concentrate its efforts on supplying and disseminating information on current research. If the needs assessment found that searching through printed data sources for information was the most heavily used technique for information gathering, but the most satisfactory technique was to telephone colleagues, CEFP/I could develop an information system that would facilitate this communication.

B. PRELIMINARY NEEDS ASSESSMENT

A preliminary needs assessment was carried out during February and March 1986. Background information for this report was gathered which aided the development of a preliminary questionnaire. During the preliminary, informal telephone interviews with fourteen CEFP/I Alberta chapter members, it was found that most individuals are able to locate the information they need by touring educational facilities, talking to colleagues at conferences or over the telephone, or talking with consultants (education specialists, engineers, etc.). Half of those surveyed felt that the processes for obtaining information was satisfactory; one felt that it was dissatisfactory; and nearly half did not have an opinion.

The telephone interviews were only a first step to help identify information areas and the occupational groups represented by the membership. A summary of the results of the interviews has been included as Appendix A. The interviews were not conducted in order to draw conclusions or make suggestions, but they were useful in the drafting of a preliminary questionnaire, which could be used as a basis for an information needs assessment. This questionnaire has been included as Appendix B.

C. HOW TO DO AN INFORMATION NEEDS ASSESSMENT

The first step in carrying out an information needs assessment is to identify and study the potential clients of a CEFP/I information service. The potential clients are present and future members of CEFP/I. Future membership should be taken into account if the organization is planning to encourage individuals in previously unrepresented occupational groups or geographic areas to join. For example, if CEFP/I was to encourage educational facility planners in Quebec to join, then the needs assessment should include a section on language.

The second step in an information needs assessment is to determine what the information needs are. There are a number of ways this can be done:

1. Members could be studied and their information requirements identified and analyzed. This technique requires that someone watches potential clients and analyze and categorize the information they use, and "how they obtain that information". This approach is not viable for an organization which is geographically dispersed or as large as CEFP/I. Nor would it be viable to undertake a modified version of this approach, whereby typical members would be identified and studied. The membership is so diverse that defining "typical" would be extremely difficult.

2. Members could be "asked" what their information needs are. This could be done by interviews in which standard questions are asked, or by a questionnaire. Again, because of dispersion, a questionnaire is the best choice even though questionnaires are far from perfect. It is difficult to obtain a complete set of information requirements since people are usually biased in favour of information they have searched for recently. Non-returned questionnaires also skew the results. This can be minimized if the questionnaires are follow d-up with letters or telephone calls. Due to constraints previously mentioned, a questionnaire is probably the best method available at this time for determining the members' information needs.

SECTION 4

LITERATURE OF EDUCATIONAL FACILITIES

A. WHAT IT IS

The topic of educational facilities planning is multidisciplinary in nature, and thus requires a multifaceted approach to information retrieval. An illustration of the diverse nature of research in this field is provided by the document Planning and Designing School Computer Facilities (Finance and Administration Division, Alberta Education, November, 1985). Several factors were considered in the report: health and safety, ergonomics, curriculum objectives, microcomputers, physical environment for hardware and user, security, electrical design, architectural design, and maintenance of hardware and software. If time and resources were unlimited, approximately twenty-five public information sources (on-line databases) in North America and Europe could have been searched for this information.

From this example and other findings, the literature on educational facilities can be characterized by three facets:

1. **Subject:** relevant information is dispersed through a number of broad subject areas; i.e., education, engineering, computer technology, etc.

2. **Format type:** relevant information is available in numeric data, descriptive text and illustration.

3. **Publication type:** relevant information is available from journal articles, unpublished reports, conference proceedings, speeches, computer printouts, etc.

B. WHERE TO FIND IT

1. Databases and Indexes

Not only is the literature multidisciplinary in nature, but access to it is dispersed into several outlets: printed indexes, public and semi-public on-line databases, private collections and in-house databases. Table 1 provides a classified list of currently available information sources (on-line databases and printed indexes) where information relevant to all aspects of educational facilities can be found. Detailed description of these sources are noted in Appendix C. These sources are generally of three types: bibliographic (provides citations to journals, books, etc.); referral (provides agencies, names and addresses); and numeric (statistics, demographics). All of the databases will incur some cost in their use: subscription fees, usage costs, communications cost, cost of printing information offline or on-line. Such costs can make it prohibitive for individuals to subscribe to and use such services. Access to them is generally through libraries which offer such services, or information brokers.

2. Grey Literature

On-line databases and printed indexes can provide access to a wealth of information, but not all information. There is one area of the literature not to be found on databases or in printed indexes - **Grey Literature.** Grey literature can be defined as literature which is not issued formally and/or literature which is not available through normal channels. Normal channels are considered to be standard bibliograhical lists, printed indexes and on-line databases. Grey literature can consist of reports, codes, preprints and reprints, trade literature and conference proceedings. **Grey literature is not restricted literature; it is merely difficult to identify and obtain.** It may also be very useful to practitioners. Most journal articles are not "grey" because they are indexed (e.g., CEFP Journal), but many newsletters are "grey" since they are not (e.g., CEFP/I News and Views.

Government reports, such as the one cited earlier in this section, are generally considered to be grey literature. This is unfortunate, since it implies that no one knows about them, and much potentially valuable information is left unused. Several indexing services are attempting to identify and make accessible such material: Alberta Education Index, Ontario Education Resources Information System (Onteris) and ERIC. However, the largest problem which remains is that of identifying what is being published, formally or informally. The indexing services are only including what is submitted to them and not all organizations are consistently notifying indexing services. **Publicizing and sharing information would go a long way to alleviating some of the problems associated with grey literature.**

Table 2 provides a list of possible sources of grey literature. Contacting the organization, association and individuals and asking for a publication list is usually the only way of identifying what is available.

3. Colleagues

An additional and very important source of information, not as yet mentioned, is word of mouth - contact with colleagues via conferences, telephone, letters and computers. More than any other method of information gathering, personal contact is the easiest and most widely used in all walks of life and by all kinds of people. It is the primary reason for conferences, seminars and workshops, and is probably the most valued result of such gatherings. While a CEFP/I member may not be able to access on-line databases or take the time to carry out research to solve a problem, he always has access to a personal network of key people who may help with the problem. Due to the ease with which it is generally done, the low cost entailed, the satisfaction enjoyed by interpersonal communication, and the immediate benefits to the users, personal contact is the most valuable form of information gathering.

TABLE 2

Possible Sources of Grey Literature

RESEARCH INSTITUTIONS AND ASSOCIATIONS:

Academy for Educational Development (AED)*
Alberta Teachers' Association (and other provincial teachers' associations)
American Association of School Administrators (AASA)*
Association of Physical Plan Administrators of Universities and Colleges (APPA)*
Association of School Business Officials of the United States and Canada (ASBO)*
Canadian Education Association/Association Canadienne d'Education*
Centre for Architectural Research, Rensselaer Polytechnic Institute*
Centre for Education Policies Studies, University of Minnesota*
Centre for Education Research and Field Services, New York University*
Educational Research Council of America (ERCA)*
Educational Facilities Laboratories (EFL)*
Educational Planning Service, University of Northern Colorado*
International and Development Education Program, University of Pittsburgh*
National Association of Secondary School Principals (NASSP)*.
Stanford University School Planning Laboratory (SPL)*
Far West Laboratory for Educational Research, San Francisco

OTHERS:

School boards
Education faculties, universities
Provincial and state government departments overseeing school planning and funding
Federally funded agencies concerned with education
Consultants, architects

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*described in Appendix C: Associations and Research Institutes

C. HOW TO GET IT

The availability and number of specialized on-line databases and printed indexes enables users to identify many potential sources of information to help solve their problems.

In order for an individual or organization to access information on an on-line database, they must have a computer terminal with communications capabilities (a modem or acoustic coupler). To search most on-line databases, one must have a password. In order to get the password, searchers must contact the vendor prior to the first search. Some vendors only charge for actual searching done, others charge a monthly or yearly subscription fee.

Getting the information, however, is another step and potentially, another problem. The inclusion of a citation on a database or in an index is not a guarantee that the information is obtainable or even available; it is only an indication of its existence. If the on-line database does not provide full text retrieval, a microfiche or text service (such as ERIC does); or the local library facilities cannot fulfill a request for a particular item from the collection, the interlibrary loan process comes into play. The "difficult" item can take up to six weeks or more to obtain depending on the lending institution. Resources, i.e., money and personnel, play a considerable role in how quickly information is retrieved and how far an individual or organization can go in obtaining the information.

D. SUMMARY

1. **What resources are available to CEFP/I members now?**

   - Public and semi-public commercial on-line databases (bibliographic, referral and numeric)
   - Printed indexes
   - Libraries, information brokers
   - Colleagues via personal contact, telephone, letters, computer
   - Conferences, workshops, seminars
   - Research from other organizations, associations and research institutions

2. **What hindrances exist in using these resources?**

   In using the information sources, i.e., on-line databases, indexes:

   Congestion - the volume of published information demands a parallel increase in the information search and handling capacity of the user. Since the user's capacity is limited, the required search capacity may exceed the available search capacity. This causes a decline in information search effectiveness.

   Dispersal - the literature is dispersed by media, language, discipline and to various dissemination centres. Therefore, research must cover a greater range of publications, media, languages and disciplines. Researchers generally fail to spread a search over as wide an area as the dispersal of their discipline (or problem) demands.

Grey literature - reports, codes, standards and specifications, patents, preprints and reprints, trade literature, conference proceedings, translations not published commercially and technical recommendations; can be published on paper, microform, as photographs, maps, slides or computer printouts.

Time - becomes an issue due to the increasing amount of information, the number of on-line databases and indexes to be checked, and the greater diversity and complexity of information retrieval systems.

Additional problems of the user:

Inadequate search skills - user (CEFP/I member or information intermediary, e.g., librarian) need to have knowledge of the subject being researched; a realization of the value and importance of information; sufficient and sustained interest and time to trace required information; adequate search capacity; familiarity with published information sources; and familiarity with library collection and available information facilities and services.

Lack of resources - library facilities and search centres may not be available to the member.

Lack of money - to attend workshops, conferences; to take advantage of available information sources.

Lack of time - to tap potentially useful resources; to attend conferences, seminars and workshops; and to keep up with new developments in the field.

Information exchange - members may be unaware of the formal and informal channels by which information can and should be shared with other members, research organizations, institutions and governments.

3. What is CEFP/I's role in the context of available resources?

Given the potential availability of information relevant to educational facilities, the role of CEFP/I could be defined in several ways. They are:

- Central collector of all material on educational facilities, including that already accessible through formal channels
- Collector of some part of the available resources (e.g., grey literature)
- Reference service - subscribing to on-line databases and providing personnel to do the research and obtain the information for the user
- Referral service - refer user to appropriate search facilities, organizations, associations and research institutions
- Combination of some or all of above

4. Considerations

If CEFP/I intends to become a central collector of all information on educational facilities (first point above), one method of doing this is to download search results from on-line databases to create an in-house database. These search results can be transferred to a local computer and stored for re-searching. Once this information has been stored locally, some information services (i.e., libraries) remanipulate, reformat the results, or merge them with information in the in-house database. This information can then be re-searched.

Most publishers of databases, such as the publisher of Social Scisearch, index and make the information available as a for-profit business. However, other publishers, such as the publishers of ERIC, offer their database as a service and only charge users of the database a fee that will offset the cost of production. These costs usually appear as a royalty charge to the user.

Because publishers do not receive royalty fees for searches done on downloaded information, it may be that copyright is being infringed upon. Current Canadian law does not address this issue; however, it is likely that any revisions to the copyright law will take the "ownership" of information in machine-readable form into consideration. Some database publishers will give permission to organizations to download and re-search information.

SECTION 5

FUNCTIONS OF AN INFORMATION SERVICE

Based on CEFP/I's goals for an information service (see p. 2), service functions, function objectives and major considerations for the implementation of functions are identified and outlined in Table 3. A recognition and understanding of these functions provides a platform for planning, management and resource allocation of an information service.

TABLE 3

INFORMATION SERVICE FUNCTIONS

FUNCTION	OBJECTIVE	MAJOR CONSIDERATIONS
Identification of Materials	-exhaustive searches of all possible sources to identify relevant material (e.g. school boards, journals, newsletters)	-for whom? (users) -by whom? (personnel) -resources (e.g., printed indexes, on-line databases, subscriptions to newsletters, etc.) from which to identify materials
Collection	-ready access to information when required	-from whom is material bought, copied, borrowed, etc.? -personnel to do it -housing, maintenance and organization of collection -scope, content and format of material collected -budget to buy materials
Access	-provide intellectual as opposed to physical access to the collection (e.g., by indexing and abstracting)	-knowledgeable, trained personnel -methods used to provide access (e.g., standardized descriptors, free text, or keyword) -system for providing access (retrieval) (e.g., use of a database management system) -cost
Dissemination	-distribution of information provided from the collection and resource people	-personnel -who pays for distribution costs (The organization or membership) -commitment of the membership in providing resources and information. -how the information will be distributed (e.g., telephone, postal delivery, electronic mail)
Reference and Referral	-provide information from resources at hand -provide a link to people, organizations, and other sources	-identify and maintain current file of individuals and organizations -knowledgeable, trained staff -what linking processes - telephone, electronic bulletin boards
Communication	-provide a forum for the exchange of ideas and information	-channels of communication to be used: telephone, electronic mail, electronic bulletin boards, printed word

Providing any level of information via an information service requires money. Costs of the service are determined by :

- level of service, e.g., all functions may be implemented or only some functions are implemented

- level at which function is implemented, e.g., quick reference or referral; extensive reference requiring one or more man-hours, using on-line commercial information services.

- automation of functions - access and retrieval using a database management system; dissemination using electronic communications, referral using an on-line classified directory or bulletin board.

- level of staffing - number and man-hours

- type of staff - clerical, professional, paraprofessional

- size of collection, housing of collection

Once functions for a service have been determined, options for the implementation of those functions can be explored. The next section examines the role that computer technology might play in the implementation of these functions.

In the final sections of this report, options that emanate from these six functions and alternatives for implementing them are discussed.

SECTION 6

TECHNOLOGY AVAILABLE TO CEFP/I

Several technologies are currently available to CEFP/I which would facilitate the implementation of the functions of an information service. The following definitions and descriptions are given to provide an understanding of the technology itself; applications or models are provided for the purpose of additional explanation, and to show how the technology has been used in certain contexts similar to or of immediate value to CEFP/I's proposed information system.

A. COMMUNICATIONS

Before discussing the various ways in which computer technology can be used in providing information services, a brief summary of how communication between computers takes place is in order. Generally, this communication can be done via telephone lines which are **voice-grade** or **data-grade.**

1. Voice-grade lines

The user having appropriate communications software and a **modem** (a device which translates digitized data from a computer to analogue format so that it can be transmitted through a telephone line), dials a local or long-distance number using a telephone line from his office or home, connects to the host computer and transacts his business. The major consideration in using a voice-grade line is the security and quality of the data sent or received. Voice-grade lines are not intended for data transmission and there is no support given to use of voice-grade telephone lines for data transmission. Users must also pay for the cost of the local or long-distance calles made.

2. Data-grade lines

The most common form of data-grade lines for long-distance transmission of data are packet-switched networks, such as **Datapac** in Canada, or **Tymnet** or **Telenet** in the United States. The user calls a number which would connect him to a "node" of the communication network. For most users, this would be a local call since nodes are present in most cities in North America. The packet-switching network divides the data traffic it receives from all users into blocks called "packets" which have a given maximum length. Each packet of user data travels in a data envelope which gives the destination address of the packet and a variety of control information. The computer at each switching node reads the packet into its memory, examines the address, selects the node to which it shall transmit the packet, and sends it on its way to its destination. It is rather like a postal service in which letters in envelopes are passed from one post office to another until they reach their destination. The typical delivery time is about a tenth of a second.

The primary reason for using Datapac is that data sent or received is securely packaged during its transmission because the telephone lines used are intended and designed specifically for data transmission. The user only has to telephone one number, generally to a local node, get on to Datapac and give the Datapac address of the host computer to be reached. Costs of Datapac include the one-time installation fee ($125.00); monthly access service ($134.00); usage costs ($.45 per kilo pac or 256,000 characters).

Through Datapac, users can be connected to U.S. and European packet-switched networks.

B. DATABASES AND DATABASE MANAGEMENT SYSTEMS

A **Database** is any collection of data or information which is stored in an organized form such that elements may be quickly and easily retrieved, added or changed. A major trait of a database is the organization of the data. Databases may be manual systems or automated systems.

A **Database Management System** or a DBMS as it is also called, is used to access the information in a database. It is a special set of programs that manage the storage, access, updating and maintenance of a database. Data are organized so that they may be retrieved via access programs by a number of different means independent of the organizing program logic. Most DBMS allow the database manager to:

- create new files
- manage data
- add records to existing files
- merge files
- retrieve and format information
- check for errors on new data (not all DBMS have error checking built in, although the best systems do)
- update or edit existing records
- delete records
- create reports

1. Types of databases

Databases may contain bibliographic information, numeric files, or file text/reference information. A bibliographic database contains citations and sometimes abstracts of books, journal articles, reports, etc. An example of this type of database is ERIC. The information contained in this type of database can be accessed by searching for a given title, author, publication date, subject (also known as descriptor) or a free text search for terms appearing in any or specified fields. A numeric database contains numbers and this information can usually be manipulated beyond simple retrieval (i.e., regression analysis may be performed). Full text or reference databases contain the full text of articles, directories or encyclopedia.

2. Considerations in building a database

- The information to be included in the database needs to be identified and a system put in place to continually gather the information.

- Guidelines have to be developed concerning the collection of the data, the input style and the length of time the information will be held in the database.

- A decision must be made on how the information will be retrieved. Retrieval can be on given fields, on free text and/or on controlled vocabulary. If controlled vocabulary is used a thesaurus must be developed, giving the terms to be used plus definitions of those terms and the cross references to similar or related terms.

- The information must be indexed based on the decision as to how the information will be retrieved. The index process could use a professional indexer or trained secretarial staff. The decision on who should do the indexing should be based on how sophisticated the indexing system is. This decision will affect the cost of building the database (i.e., secretarial staff are less expensive to hire) but also affects the quality of the product, and therefore the satisfaction with the end product.

3. Factors influencing costs of developing a database management system

- hardware costs	fixed cost
- software costs	fixed cost or continuing cost
- systems development costs	fixed cost
- programming costs	fixed cost or continuing cost
- personnel costs	continuing cost
- maintenance costs	continuing cost
- cost of the information	continuing cost
- telecommunication costs	continuing cost
- storage costs	continuing cost

4. Hardware Considerations

Databases can be developed on personal computers or microcomputers, minicomputers or mainframes. The differences between the three types of computers are numerous; but for the purposes of a DBMS, significant in terms of storage capabilities. Microcomputers are becoming more sophisticated, flexible and inexpensive. These factors make a microcomputer desirable for building a database; however, there are limits as to the number of records that can be available on-line at any given time. There are also limits on the number of users who can access the system at any given time. The final decision as to what kind of computer to use depends largely on the following factors:

- How much the organization wants to spend. Microcomputers are the cheapest but would also require the purchase of peripheral equipment such as a hard disk to expand the memory.

- The size of the database, i.e., the number of records and the size of those records. If the maximum size of the database were 5,000 records of 2,000 characters/record then a mainframe would not necessarily be required.

- The number and types of operations that would be available. If statistical analysis as well as bibliographical retrieval were to be carried out on information in the database, then a microcomputer might not be powerful enough in terms of the desired time to carry out those operations.

- Support and service for hardware offered by the hardware vendors.

The last two considerations are less important today than in the past. Technology is changing so rapidly that the division between microcomputers and minicomputers has nearly disappeared.

5. Software considerations

CEFP/I could develop its own DBMS or it could buy a software package. There are numerous software packages available to run on all types of computers. The development costs vary dramatically based on which route is taken and what applications are desired. Prior determination of the type of data, general size of the records (i.e.. description of the data), and the applications are necessary to make a decision on a package or the development of an in-house system. It may be that none of the DBMSs available will do the tasks that are desired. Not only initial development but in-house software maintenance may be required.

6. Considerations when buying a software package

- **Costs** - Packages vary from inexpensive microcomputer systems to expensive mainframe systems.

  e.g. - dBASE III for use on a microcomputer costs approximately $650.00
  - BRS/Search for use on a supermicrocomputer or minicomputer costs from $7500.00 to $30,000.00 depending on number of users supported
  - BASIS or BRS/Search for use on a mainframe costs approximately $90,000

- **Staff** - there must be staff to implement the system, make any changes and handle maintenance problems.

- **Support** - some software vendors also sell the service contracts that specify the amount of aid they will give with your software (adapting, etc.). This may be important in large systems.

- **Hardware** - most packages are designed for specific (or a number of specified) hardware environments.

- **Operating Systems** - most packages are designed to be used with a specified operating system.

- **Desired Speed of Retrieval** - some DBMSs are designed so that the information can be retrieved quickly while other systems take longer to retrieve the desired information. This is partially dependent on how the information is stored internally and the method of retrieval.

- **Capacity** - many packages have a maximum record size and maximum number of records. Not all may meet the needs of the organization.

- **Documentation** - there should be complete, readable documentation available.

If a package is bought and modified there are additional considerations:

- extra staff time is required to specify changes

- extra programming costs will be incurred

- delay in implementation

- possible incompatibility with future changes in the software

7. Considerations for developing your own Database Management System

- **Costs** - there is no set cost for developing a database. Costs are contingent on: complexity of the design and systems development; cost of hiring programmers; cost of maintenance, including changes after initial development. One rough estimate of cost is $12,000 to $16,000, based on twelve to sixteen weeks of system design work plus $25,000 to $38,000 programming and implementation cost (see Appendix D).

- **Hardware** - the hardware the system will be maintained on may be predetermined by what is already owned or leased by the organization, or new hardware to be purchased will have to be examined. The software cannot be written in isolation from the hardware.

- **Staff** - will be required for running the system, making adjustments and handling maintenance.

  Reports - desired outputs must be determined and programmed into the DBMS.

- **Desired speed of retrieval** - how quickly information should be retrieved must be taken into consideration when the DBMS is designed and programmed. This is partially dependent on how the information is stored internally and what method of retrieval is chosen.

- **Implementation time** - how long it will take to have the DBMS designed, programmed, debugged and implemented must be considered.

- **Documentation** - complete and readable documentation on the design and running of the system must be written.

8. Other considerations

CEFP/I could build a database of information then hand over the information and the responsibility for the availability of the information, to a commercial database vendor. There are a number of vendors who might be considered, such as Lockheed Information Systems (Dialog), Bibliographic Retrieval Systems (BRS), QL Systems Ltd. and SDC Information Services (Orbit).

C. ELECTRONIC MAIL SYSTEMS
(also known as **Personal Messaging, E-Mail**)

E-Mail systems allow subscribers of a service to send to and receive messages from other groups or individuals on the service. They connect the user directly (through a communications terminal) with a computer that allows a message to be created, edited, stored, and transmitted during the same process. The advantage over telephoning someone with a message is that, depending on your equipment, you can get

a printed copy of the messages you receive. Use of E-Mail reduces what is commonly called "telephone tag". Telephone tag has been described as the situation in which one executive makes repeated attempts to reach another by telephone, and the other makes unsuccessful attempts to return the calls. E-Mail eliminates telephone tag because the computer stores the message until the recipient is ready to read it on a display or printer terminal.

E-Mail systems can be one service (i.e., ENVOY 100) or be components of other communications networks (i.e., ENET, The Source, electronic bulletin boards).

National System:

ENVOY 100 (Available through Alberta Government Telephones)

Monthly fixed rate per organization: $20.00 plus $3.00 for each user-ID. Usage charge is based upon kilocharacters (kc) which are sent to and from ENVOY 100 by the message's originator, as well as kilocharacters which are sent to recipient(s) of the message. The sender pays to input the message and also pays for the message to be delivered. The usage charge is:

- $0.30/kc for the first 15,000 kc/month/account
- $0.25/kc for the next 25,000 kc/month/account
- $0.22/kc for over 40,000 kc/month/account
- $0.05/message/address

As an example, a 1000 character message (about 120 words) would cost the sender $0.30 to input into the system, $0.30 each time it is read and $0.05 per addressee. Thus this message sent to one addressee anywhere on the Datapac network would cost $0.65. If sent to two addresses, it would cost $1.00 ($0.30 for input and $0.35 for each addressee).

Storage charge is one-half cent/kc/day. As an example, a 1000 character message would cost about $0.15 per month to retain.

Description

National network from Trans Canada Telephone System (TCTS) which allows users to prepare, correct, send, distribute, access and file messages destined within and between subscribing companies and retain permanent records of communications. Envoy 100 is accessed by standard terminals and existing TCTS services through Datapac network. Messages can be put into the system anytime, from anywhere and held until the addressee is available, or optionally, messages can be delivered automatically to a specified terminal.

Envoy 100 can be linked to packet switched networks (like Datapac) in the United States and other international packet switched networks.

All school jurisdictions in Alberta will have Envoy 100 user IDs

Advantages of Electronic Mail

- user interacts directly with the system; intermediate steps such as longhand composition and rekeying are avoided
- allows the originator of the message and the receiver to communicate independently
- frees individuals to communicate when they cannot do so directly, or when precise, fast communication is essential
- improves group interaction
- simplifies planning activities
- enables users to reach decision points faster
- allows creation of electronic forms, e.g., questionnaires

Considerations:

- requires computer hardware/software which may not be immediately available
- telephone may be best medium - one can always leave messages or talk directly to another person
- there is a response time element which negates immediate action, should it be required
- amount of use may dictate cost effectiveness of the system
- does not allow for the posting of public messages; the originator of the message must identify all potential readers of the message, and each address the message is sent to costs an additional fee

D. ELECTRONIC BULLETIN BOARD (EBB)
(also known as **Computer Bulletin Board (CBB), or Bulletin Board System (BBS)**)

Operates the same way any bulletin boards do, except that they are housed in computer systems and accessed by a computer and the telephone. The user, through a **modem** (device to link your computer to others via a telephone line) and communication software, can log on to a **host** computer, get data, messages and information, leave messages and data, upload and download information (**file transfer**), and then log off. The user, in effect, controls the host computer throughout this process although the flexibility and power of the EBB lies in the data base of the host computer.

EBBs may vary in content, but most offer similar features:

Electronic messaging - allows users to send and receive messages to and from other users. Message lengths tend to average around 150 - 200 words. Some EBBs allow private messages, while on others all messages are public (also see Electronic Mail).

Text files - most EBBs contain text files of information intended to be read on-line or printed out for later reference (**downloading**). These items may consist of manuals, reviews, or user-contributed articles.

Bulletin board - displays semi-public or public information contributed by the system operator (**sysop**) or callers (**uploading**). Callers can read everything on a bulletin board, or pick and choose which items to read. Information on the bulletin board can be organized into subject areas or can contain miscellaneous, unrelated messages.

Uploading/Downloading - uploading is the process where the caller sends information to the host computer for later downloading by other callers. Not all bulletin boards provide for uploading contributions by callers. Downloading is the process where the caller transfers information from the host computer. Downloading is available on most bulletin boards and is probably the most used feature.

Communication Networks Which Include Bulletin Board Functions:
(Additional documentation for ENET, SpecialNet and Edline is included in Appendix E)

1. ENET - Education Network

Available to anyone with a University of Alberta MTS Account - $10.00 per month. Price based on average costs per 150 word message:

$0.45/message - send a message
$0.35/message - to receive a message
$0.60 (depending on file size) - to initiate file transfer
$0.60 - to receive a file

Description:

Established in 1985 by Alberta Education to facilitate the flow of information from the department to school jurisdictions on a daily basis. ENET is coordinated by the Communications Branch. The branch compiles information from throughout the department and posts the bulletin board on a daily basis. Provides the following features: **electronic messaging** (E-Mail), **electronic bulletin board** (EBB) and file transfer capabilities (**uploading/downloading**). Content presently includes Highlights, News Releases, Policies and Regulations, Financial Information, Research Information, Curriculum Information, access to MTS Message System. ENET is not a two-way system - only the Communications Branch can upload information on to the bulletin board.

As of January 1986 the following school jurisdictions are on ENET: Grande Prairie, Sherwood Park, Rocky Mountain House, County of Parkland, Catholic School Trustees Association.

System Administrator: Wolfgang Schimeck, Alberta Education
Phone: 427-2035

2. SpecialNet (National Association of State Directors of Special Education, Inc., 1201 - 16th Street, NW, Suite 404E, Washington, DC 20036)

Available to subscribers 24 hours per day, 7 days per week. Subscriptions: Plan I: $200 per year; subscribers are billed on a monthly basis for actual time they are connected to the SpecialNet. Plan II: $500 per year, provides a subscription and $300 prepaid computer connect time. Plan III: $1100; basically Plan II, except that it includes a Model 707 Portable Printer Electronic Data Terminal, manufactured by Texas Instruments.

Description:

SpecialNet is an education-oriented, computer-based communication network and part of a larger computer network with local telephones in all major cities. It includes **electronic mail,** and over 50 **electronic bulletin boards** addressing general information topics and special interest groups, and **uploading/downloading** capability.

National, state, and regional boards are available for subscribers to read. Some of the national boards include: **Ed. Daily** (covers Congress and federal agencies, the courts, the state, and local education agencies specifically for education administrators); **Conference** (education-related conferences); **Exchange** (facilitates the sharing of information and ideas among SpecialNet users); **Rural** (serves as a source of sharing successful practices, programs, publications, and other resources for rural special education students).

A number of states post information on EBB's set-up exclusively for their state. There is no charge for setting up a board; groups or organizations pay only for information storage which ranges from $2 to $10 per month. SpecialNet support personnel will assist in establishing and maintaining a bulletin board. A directory of SpecialNet users is available on the system.

A demonstration of SpecialNet can be arranged through Alberta Education Library Services.

3. **EdLine** (National School Public Relations Association, 1801 North Moore Street, Arlington, VA 22209)

Fee-based. Available through The Source (See this section). One-Time fee for The Source and annual fee to EdLine of $100. Available 24 hours daily. Connect time is $16.50 (days) or $7.75 (evenings).

Description:

Intended primarily for superintendents and central school district office staff. This service contains several **bulletin boards** to query, including **Education Report:** compiled by editors of Education USA and 40 education reporters across the country, appears twice daily; **Federal Alert:** contains recent legislation, appointments, etc.; **Telephone directory** for Education Department; **Legal Decisions** in education - Supreme Court judgments over the past 10 years; **Useful facts and figures:** selected education statistics from the National Council on Education Statistics; **Classroom Ideals:** management ideas, research, etc.

In addition, there are several additional agency lines available: **AASA On-line** - American Association of School Administrators provides a morning report on legislation of interest to AASA; **CCSSO On-line** - the Council of Chief State School Officers; **NASBE On-line** - National Association of State Boards of Education. Many states have created their own boards restricted for use by state personnel. These include Arkansas, Connecticut, Pennsylvania and others.

A demonstration of EdLine can be arranged through Alberta Education Library Services

4. **The Source** (Telecomputing Corporation Reader's Digest, Educational Division, 1616 Anderson Road, McLean, VA 22103)

Available to subscribers. Costs include a one-time hookup charge of $100 and two basic services -- connect-time (or hourly usage charges) and file storage. There is a minimum usage fee each time you sign on and for each month of your subscription.

Description:

This information service contains over 1,200 services and programs available to subscribers. Those concerning education and technology include **EdLine; Bulletin Board; Education** (education and financial aid, instructional programs in language arts, foreign languages, math); **Careers** (employment opportunities and industry news); **Computers** (40 categories of information on computers and their use); **Fairs and Festivals** (computers); **Mathematics** (7 categories on advanced mathematics); **Science News and Information** (24 categories of science news); and **Statistics** (20 categories on advanced statistical analysis). Other features are **Files** (for creating, editing, sorting, and structuring files on The Source); **Programs** (data base management), **electronic mail** and **uploading/downloading** capability.

A demonstration of The Source can be arranged through Alberta Education Library Services.

5. **Creating your own EBB**

EBBs can be set up on personal computers using commercially available software. Fixed costs include $2000 to $3000 for the dedicated personal computer host and modem; $8 to $300 for the bulletin board software; $150 to install a dedicated telephone line and about $15 per month for local telephone company service. Usage costs include the long distance telephone charges.

The packaged bulletin board system is usually less expensive than a national public service such as The Source. How dramatic the savings can be depends on the location and number of users. If you have more than 24 frequent users or 100 infrequent users on a packaged bulletin board system, you will probably have to go to a public service to avoid overloading the system. If a person or organization needs a national audience, a public service board will be beneficial.

The most severe limitation of packaged EBBs is that they only allow one caller at a time to use the system (single-line system). If the EBB is popular, would-be users must call several times before getting through. Once on, however, it means the caller has sole use of the system, with none of the slow response time associated with multi-user systems. The technology is currently available for multi-line EBBs, but the costs involved are too great to be borne by individuals. One company, eSoft, is planning to bring out a multi-line system in 1986.

For additional information regarding cost comparisons between the packaged EBB and the public service see "How to set up a company bulletin board". Personal Computing March 1986, pp 83-91.

6. Considerations for setting up an EBB

- what do you want to achieve with your bulletin board?
- identify your prospective users? Will they be computer or non-computer oriented, or both?
- will they demand a 24 hour system?
- how large will your data base be?
- do you want a message capability only? A conferencing-style board with long message capability?

An excellent source of information on setting up on EBB is How to create your own computer bulletin board by Lary L. Myers (Blue Ridge Summitt, PA: Tab Books Inc. 1983).

7. Advantages of an EBB

- messages can be open (readable by anyone) or personal (message can only be read by person it is being sent to)
- excellent medium for providing current awareness service to an association, organization, company, etc. Bulletins could include:
  - conference and workshop agendas
  - minutes of meetings
  - questionnaires
  - user submitted articles
  - notice of research-in-progress
  - news of developments in the profession
- facilitates problem solving among groups sharing a common interest
- provides an open forum for opinion and exchange of ideas

8. Considerations for the use of an EBB

- effectiveness is dependent upon the number of users and their access to it
- must determine users readiness to use it:
  - user must be prepared to commit resources to support the EBB. Resources include staff time as well as computer hardware and software
- effectiveness of EBB depends on availability of worthwhile and interesting materials
- effectiveness depends on willingness to change and update information quickly and regularly
- lack of computer hardware/software may make immediate application for potential users unfeasible.
- almost any kind of personal computer can gain access to an EBB as long as the files and messages uploaded (sent to the host computer) are in a common format (such as ASCII)

E. iNet 2000 - AN INTELLIGENT NETWORK

iNet 2000 is a service offered by Telecom Canada to facilitate information management. It is best represented as a "gateway" facility which connects users to a variety of information services and databases stored on many different computers. These information services may include public on-line databases (e.g., Dialog and BRS), information networks (e.g., The Source), or an in-house database operated or owned by an iNet 2000 user for the sole use of its employees or representatives.

Access to these information services is through a "gateway directory" provided on-line by iNet 2000. A user scans the directories for the appropriate information service and, provided the user is accredited to use the chosen service, is connected to that service by iNet 2000 through Datapac, Tymnet and Telenet. This process eliminates the need for the user to know the telephone number, Datapac address or protocols necessary to be connected to a host information service.

There are a number of other services provided to subscribers: electronic mail to all iNet 2000 and Envoy subscribers; the ability to manipulate information using a personal workspace and command files; and the capability of disseminating and communicating information through conferencing and notice boards. The conferencing facility allows up to twelve iNet users to monitor the activities of a conference chairperson. This feature can be used to hold on-line training sessions, or enable one or more users to monitor an on-line search being done by the conference chairperson.

Sample costs:

iNet 2000 is available locally through Altel Data, Alberta Government Telephones. A demonstration of iNet 2000 can be arranged through their office.

Telephone connections to iNet 2000 are toll free.

To communicate with iNet 2000:

6 am - 6 pm	$15.00 per hour (about $.25 per minute)
6 pm - 6 am	$11.25 per hour

To access a third party information provider*:

Canadian database	6 am - 6 pm	$6.00 per hour
	6 pm - 6 am	$4.25 per hour
U.S. database	any time	$9.00 per hour

Additional costs for storage, conferencing and messaging on iNet 2000 are available from Alberta Government Telephones.

*Prices quoted here are only for using iNet 2000 to connect the user to the database. On top of this charge, the user must also pay for the subscription and usage costs set by the individual databases. As a subscriber to iNet 2000 using third-party information services, the user is paying only for the "gateway" facility or the convenience of being connected to the databases directly. Users are responsible for obtaining and paying for subscriptions to databases they wish to use. This can be initiated through iNet 2000 which also manages the billing procedures.

Advantages:

- Users in rural areas which have no local Datapac number benefit because telephone connnections to iNet 2000 are toll free.

- Users do not have to be familiar with all the different protocols necessary to access a variety of information services.

- The service combines the "gateway" facility to information services with electronic messaging, and a number of other capabilities to provide a complete information management system without having to subscribe to separate services (i.e., Datapac for communications, Envoy for electronic mail).

Disadvantages:

- There is no real cost saving if the main use of iNet 2000 is for accessing third-party information services. It would be cheaper to pay for Datapac and go direct to the on-line databases. For example, if a user regularly searched SpecialNet, The Source, ERIC on Dialog, and Canadian statutes on QL, he would have to have subscriptions to all these services and would access them through Datapac. If the user used iNet 2000 to access these databases, he would be paying an additional charge on top just to facilitate the connection process.

  The ideal users of iNet 2000 would be those who searched only one or two databases (e.g., lawyers would usually only access QL systems) and have a need for all the other services provided by the network - messaging, conferencing, file manipulation in personal workspaces. The value of the network is highly dependent on the number of provided services needed by a user.

  For additional documentation on iNet 2000 see Appendix E.

SECTION 7

MODELS FOR THE DEVELOPMENT OF INFORMATION SERVICES

There are two aspects to be considered in implementing information services. The first is deciding the level of service to be given at information centres. Parts A and B (region-based and headquarter-based information centres) outline implementation steps that are based on budget feasibility and level of commitment that might be expected from the regions and the headquarters. These steps represent guidelines and suggestions, not necessarily prescriptions for providing service. The regions and headquarters could pick and choose steps from the different service levels in order to design the service that is responsive to membership needs as determined through an information needs assessment. The levels of service outlined for region-based information centres can be implemented at the chapter-level.

The second aspect to be considered is the level of cooperation between headquarters and regions to provide information service (part C). Models of decentralized, centralized and combined information services are presented as guidelines to help determine the configuration which would be of most benefit to the membership.

A. REGION-BASED INFORMATION SERVICE

1. Minimum Service Model

1.1 Create an executive position in the region to be responsible for information coordination, direction and/or performance of minimum service functions and marketing of services.

1.2 Initiate a newsletter (if one does not already exist).

1.3 Develop and maintain a registry of current research conducted by the local membership.

1.4 Develop and maintain a membership directory classified by expertise to allow for easier and more useful communication between colleagues in terms of sharing ideas, answering specific questions and opinion gathering on specialized topics.

1.5 Direct an information needs assessment of the membership to determine whether an information service is needed, and if so, the nature of the service.

2. Standard Service Model

(Standard service includes the basic functions of an information service; performance of these functions is not dependent on computer applications or communications)

2.1 Includes all points from Minimum Service Model.

2.2 Establish a regional information service (provide office space) staffed part-time or full-time. Staff should be able to do research and reference, indexing, and be familiar with resources in order to identify and collect materials.

2.3 Identify and collect materials for reference and loan.

2.4 Identify organizations, agencies and individuals that create information relevant to the field of educational facilities. Get on the mailing lists of these organizations and agencies to receive their material.

2.5 Collect newsletters from the headquarters and other regions and chapters of CEFP/I.

2.6 Actively collect papers, reports and other documents written or prepared by members.

2.7 Index newsletters and materials deposited by regional members and other stakeholders.

2.8 Build contacts with executives of other regions in order to share own resources and encourage them to share theirs.

2.9 Provide photocopying services and dissemination of information resources.

2.10 Identify other local agencies and libraries that may have relevant materials and resources of use to the regional information centre and members. Determine if these agencies and libraries will extend their services directly to members; if not, attempt to become an intermediary between the members and these other resource centres.

2.11 If regional members would like a proactive service whereby the staff provides information relevant to their particular research interests, a basic SDI (Selective Dissemination of Information) service could be initiated and maintained. The staff would keep current interest profiles of the members who would like this service. Material identified or collected at the information centre would be matched with the interest profiles and the members would be notified that relevant material was available.

2.12 Market the information centre service: maintain a high profile within the region; use the newsletter as a communication channel - include information about the services, cite specific reports, etc. that would be of use to the majority of members.

3. High-Tech Model

3.1 Includes all of the points raised in the Minimum Service Model and Standard Service Model, but facilitated by the use of computer applications and communications.

Example:

- using commercial or in-house developed software to index and provide access to the collection
- using electronic mail service to link the information centre with members
- building an on-line database to access the collection using commercially available or in-house developed software

3.2 *Subscribe to on-line database services in order to:

a) Provide a wider range of information resources to the membership.
b) Enable a more sophisticated and proactive SDI service. The staff would actively seek out information beyond local resources.
c) Quickly and efficiently access information to solve specific problems.
d) Enable a small information service to have access to a large collection of reference tools on-line that would normally be beyond the financial and physical means of the chapter to collect (e.g., directories, encyclopedias, almanacs, international conference agendas).

3.3 Subscribe to iNet 2000 (see p. 28) which provides Electronic-Mail; a gateway to other information providers (e.g., on-line databases); and conferencing capabilities among subscribers.

3.4 Develop a bulletin board service (see p. 23). Market such a service as an addition to newsletters and as a forum for members to exchange ideas. The content of the bulletin board should include: a) the classified directory of

members; b) the directory of current research; c) news and highlights; and d) announcements of upcoming meetings and agendas. This service would be readily accessible to the staff to print off information for members who do not have direct access by computer. Members who do have computer access could download this information for their own purposes.

*These services are fee-based, therefore the chapter must decide who pays for the services, e.g., charge back costs incurred to the members or subsidize the service. These services include access and searching on-line databases, and subscribing to iNet 2000.

B. HEADQUARTER-BASED INFORMATION SERVICE

1. Minimum Service Model

1.1 Appoint or hire someone to direct the following tasks.

1.2 Evaluate present services in order to determine strengths and weaknesses of the services and market those services. If the evaluation is beyond the capabilities of the present staff, hire a consultant to do it.

1.3 Encourage the regions to undertake information needs assessment of members; build on regional needs assessments to define a membership wide profile; or, undertake a membership wide information needs assessment.

1.4 Make newsletters important as current awareness vehicles or channels and encourage members to submit information to them. (e.g., News and Views)

1.5 Develop and market a registry of current research.

1.6 Develop and maintain a membership directory classified by expertise and areas of involvement to allow for easier and more useful communication between colleagues in terms of sharing ideas, answering specific topics. This implies excellent communication between the regions and headquarters.

2. Standard Service Model

2.1 Includes all of the points from minimum service model.

2.2 Hire additional staff. This staff should be able to do the following:

a) reference and research
b) index
c) be familiar with resources in order to build a collection

2.3 The tasks for the staff would be:

a) Collect regional newsletters.
b) Collect papers presented at all meetings, workshops, conferences, seminars and training documents, if any, and provide physical and intellectual access to this information.

2.4 Identify relevant outside organizations, such as Educational Facilities Laboratories, collect their publications and find out what their initiatives are in the field of educational facilities.

2.5 Identify and collect relevant materials on educational facilities. This could be a comprehensive collection; a standard reference collection (i.e., directories, manuals, handbooks); or, a collection of grey literature as previously discussed (p.). In addition, journals covering the fields of educational facilities could be collected.

2.6 Provide services such as photocopying on demand, from articles, reports, etc. The information could be mailed out, or delivered by courier depending on urgency of the request.

2.7 Provide reference services; members could contact the headquarter-based information service via the telephone or mail.

2.8 Market the Council's services, newsletters and journals and at conferences. Meet as many executives of the organization as possible, and interact with any regional information services.

3. High Technology Model

3.1 Includes all of the points raised in Minimum and Standard Service Models, but facilitated by the use of computer applications and communications.

3.2 Subscribe to on-line databases in order to provide a wider range of information services to the membership.

3.3 Provide a bulletin board service (see p. 23); market the service as an addition to newsletters and as a forum for members to exchange ideas. The content of the bulletin board should include: a) the classified directory of members; b) the directory of current research; c) news and highlights; and d) announcements of upcoming meetings and agendas. This service would be readily accessible to the information centre staff to print off information for members who may not have direct access by computer. Members who do have computer access could download this information for their own purposes.

3.4 Create an on-line database service of information relevant to all fields of educational facilities. This database could contain the following: information on the headquarters' collection; information on educational facilities that exist in outside collections; or, information on educational facilities without indicating the location of this material. This database could be made available by computer to all members who can and wish to access the headquarters, or it could be made available by a commercial vendor (p. 21).

C. MODELS FOR COOPERATION BETWEEN REGION-BASED AND HEADQUARTER-BASED INFORMATION SERVICES

These models outline levels of cooperation between headquarter-based and region-based information services as possible means of accomplishing the goals of CEFP/I for providing information to their membership. The handling of materials and information in support of the CEFP/I information service can be done by a central authority, by the regions, or by a combination of efforts. The headquarters could pay all of the costs to operate an information service (e.g., staff, acquisition of material and dissemination costs), or the costs could be absorbed primarily by the regions. Possible alternatives for accomplishing information provision are:

1. Decentralized Model

Each region might develop autonomous information services which would not necessarily strive for the same goals or levels of service due to differing organizational priorities and fiscal constraints. Autonomous chapters could perform the identification, collection and indexing of materials and possibly contribute this information to the headquarters.

Advantage:

- Low cost to the headquarters.

Disadvantages:

- Lack of control which the headquarter-based information service can exercise over all the support activities, i.e., identification, collection, access and dissemination (the headquarters must then rely on the good intentions and expertise of the regions for the performance of these functions).

- Any fiscal constraints or organizational priorities of individual regions can affect the scope and quality of their contribution of information to the headquarters.

2. Centralized Model

A strong centrally-based information service (i.e., headquarter-based information service) would carry out all functions: identification, collection, access, dissemination and loaning of materials.

Advantages:

- All materials can be located in one place and loaned from one service which is a definite advantage for users of the system since all queries, requests, and contributions can be directed to one place.

- Standards for selection of material, indexing, etc. can be maintained.

- Any changes to the service can be accomplished easily because they primarily affect in-house operations at the headquarters, not at the regions. For example, changes in indexing methods would be simpler to effect because headquarters would not have to coordinate changes with the regions.

- There would be no duplication of the activities of indexing and operating an information service at the regional level. Available resources would be used efficiently and effectively.

Disadvantages:

- Because members are spread across the continent, the turnaround time for disseminating information from headquarters becomes an issue, unless high speed transmission of information is accomplished through use of computer technology.

3. Combination

A combination of region-based information centres with a coordinating central authority at the headquarters is another alternative. The headquarters' role in this context can be one of setting basic rules and policy for accomplishing the selection and indexing of materials in the regions. The relationship between headquarters and regions can function in a number of ways:

a) Each chapter would identify, collect, etc. materials from its own region, contribute the information on these materials to the headquarters, and be responsible for loaning its material to interested parties in any other region.

b) Each chapter would identify and index materials in its region, contribute the information on these materials to the headquarters, and collect materials from every other region in an effort to make the materials readily available to members in their own region. This situation is very costly but very convenient for the members.

Advantage:

- The region-based information centres can be an effective regional presence that can promote the work and purpose of information identification and sharing sponsored by CEFP/I - a very important consideration since the real purpose of the entire effort is to inform a variety of people of the existence and availability of information on educational facilities.

- Depending on the service level of each region, immediate benefits can be realized by members since queries can be dealt with at a local level.

D. SUMMARY

The determination of levels of service and the development of service in each information centre can take place autonomously, or in conjunction with each other. A bottom-up or top-down approach can be taken to determine the levels of cooperation between headquarters and regions.

In the bottom-up approach, information centres first determine their own levels of service based on local conditions, and then consider cooperation with other information centres. In other words, service models (i.e., minimum, standard or high-tech) are looked at first; models for cooperation are considered after information

services are established. This implies that information centres will develop at their own pace to their own level of service and cooperation with others **may** subsequently take place.

In the top-down approach, models for cooperative efforts are considered from the outset by information centres. The central authority determines the level of contribution made by the regions to provide overall information service to members. Depending on the role of the central authority, the central authority could dictate the level of service (i.e., minimum, standard, or high-tech) provided in other information centres, or it might only dictate policy in terms of what is collected and how it is indexed in each information centre.

SECTION 8

RECOMMENDATIONS

1. **In order to develop an effective information service, an information needs assessment must be undertaken (see Section 3).** This can be done on a region-by-region basis, but should be centrally coordinated so that comparable information will be collected. The results of the needs assessment will help to clarify the goals and objectives of the information system(s).

2. **The present membership directory should be upgraded to a directory which is classified by expertise and areas of specialization and/or interest.** Based on interviews with CEFP/I members, one of the most useful techniques for information gathering and problem solving is, at present, personal contact with colleagues. A classified directory would enable a member with a specific problem to identify other individuals who are working in a similar area. Members should be asked to submit a profile of their current interests and areas of expertise to a CEFP/I "directory planner". This information should be updated on a continuing basis. A standard form should be used to develop these profiles.

3a. **Each region should be made responsible for collecting regional newsletters, papers presented at CEFP/I regional conferences, regional seminars and workshops, and index the above material for the benefit of all members in all regions.** The responsibility for collecting and indexing non-regional information such as the CEFP Journal, News and Views and papers presented at the international conferences must be assigned to one region, the headquarters, or all regions, or

3b. **ONE region could be appointed to undertake the collection and indexing of ALL CEFP/I newsletters, papers presented at CEFP/I conferences (international and regional), and all CEFP/I sponsored seminars and workshops.** This would also be for the benefit of all members in all regions.

Option 3a. is preferable because it is easier to collect information in one's own jurisdiction. If only one region were to take on this responsibility (3b) then the success of the service is dependent upon the commitment of the other regions to identify and make available their regional information.

4. **Services offered by the information centre in Columbus should be evaluated in terms of the quality of the collection and the present staffing levels.** If useful information is available, then services should be marketed. Evaluation of the collection and services should be carried out by an information consultant who has subject expertise in the field of educational facility planning.

5. **Information provision should be encouraged at the regional level even if a headquarter-based information service is the goal.** Region-based services could facilitate the growth of a central information service provided there is communication and cooperation toward this end. At the very least, the regions can function as clearinghouses for the headquarters, i.e., regions identify, collect, and forward publications prepared by members in their jurisdictions to the headquarters where they would be indexed and disseminated.

6. **The more planning that is done, the more cost-effective and efficient the information service will be, because providing information costs money.**